DOCUMENT RESUME

ED 366 812 CE 065 720

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TITLE Learning Just-in-Time.
PUB DATE 19 Nov 93
NOTE 14p.; Paper presented at the Annual Meeting of the American Association for Adult and Continuing Education (Dallas, TX, November 19, 1993).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Communication Skills; Educational Research; *Education Work Relationship; Employee Attitudes; Foreign Countries; Interpersonal Competence; *Manufacturing Industry; *On the Job Training; *Organizational Change; Organizational Development; Technological Advancement; Vocational Education
IDENTIFIERS *Just in Time Systems

ABSTRACT

A study explored training from the perspective of the trainees, what it meant for them when they were faced with a major reorganization of their work, and what its impact was. Data were collected from 10 women operators working in cellular manufacturing, 2 foremen, and 1 forewoman. The interviewees selected by the management had converted to Just-in-Time (JIT), a method of industrial organization aimed at producing only what is needed, when it is needed, and had received training. They expressed voluntarily their ideas on the change the company was undergoing and on the training they had received. The employees remembered their JIT training as extremely stressful. However, they were on the whole quite positive about the introduction of JIT methods. The technical aspect of JIT training did not appear difficult for the employees who all had previous experience as operators; they focused much more on the social skills required to work within a cell. They insisted on the importance of communication skills, on the spirit that makes a team productive, and on solving the inevitable tensions. When asked about the impact of the training, 11 of 13 interviewees mentioned the improvement in communications. JIT training had some implications for adult education. Learning JIT was learning to perform multiple tasks on the production line, but even more it meant learning communication skills and learning to redefine one's rapport with one's own work and with the company. (YLB)

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ED 366 812

Learning Just-in-time

Paper presented at the AAAACE Conference, Dallas, TX, November 19th, 1993

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The challenges of the new economy put great pressure on medium-size and small industries. To survive, they are forced to modify their mode of production; new technology is introduced and work is reorganized. Training becomes a necessary component in the transformation of the workplace.

In this paper, we want to look at training from the perspective of the trainees, what it means for them when they are faced with a major reorganization of their work and what its impact is. Our paper is divided in three parts. In the first part, we introduce the site where the data was collected[1]; the second part consists in an analysis of the significance given to training and its impact by the trainees and in the last part of the paper, implications for adult education are discussed.

1. The context of a medium-size manufacture

The company A is a medium-size family company and it manufactures hockey and baseball equipment. Fifty years ago, leather was the main material used in the fabrication of the equipment but, over the years, the materials have changed, which has forced changes in production and adjustments in mentalities. At the time of the interviews, there were one hundred and sixty employees in the company, most of whom were women operators. Some employees had

over thirty years of seniority while others had been employed a few year only; almost all of them had been trained on the job.

Aiming at more efficiency and competitiveness, the company was entirely committed to revising its management as well as its methods of production, and it counted on the collaboration of its employees to make the necessary changes. When its own market had been threatened a few year earlier, the top management had turned to cellular manufacturing and just-in-time for greater efficiency; machines and tools were improved with new technology, changes were seen on the production line and a three year training plan began. Training was considered an investment by the managers; it was very much the key to the transformation of the culture of the company, a necessary asset for the economic survival.

The introduction of Just-in-time methods came as a complement to cellular manufacturing. The taylorist division of labor was replaced by work-teams which became entirely responsible for the production and packing of an item or a family of products. Trained to accomplish different tasks, the operators of a production cell acquired a certain flexibility which makes them reliable, whatever the orders may be. To increase efficiency, the production line was reorganized in a U layout; a few sewing machines were added and others were improved. For the operators, the transformation of the production line means that, instead of sitting alone with their lot in front of one machine, they stand and work on three different

machines; they are responsible for the operations related to those machines and they also have to help the person next to them to maintain a continuous flow of operations. Mutual aid and cooperation are the rule to insure harmony in cellular manufacturing. The goal is to deliver the orders in the shortest possible time.

Most of the training which took place in the company was related to Just-in-time methods, since changes had to be made to the entire production system. In the first phase, there was an initiation to the multiple tasks on the production line. Because of its competence and its motivation, the work-team which made hockey pants and its foreman were chosen by the management to be the first to receive Just-in-time training, given by the company which had updated the installations. The change in behaviour had to be learned within a few days: the ten operators had to stand in front of their thirty machines, perform the required multiple tasks on their own three machines, respect the time set for each operation, and help the person on their left or on their right, to maintain the pace.

The second phase of training consisted in sessions on communication skills, tailored for the operators and contracted with private consultants or a public community college; the foremen participated in sessions on leadership and on production planning. The third phase of the training was planned to be

quality contol related. After the first team was trained in Just-in-time, all the training which took place in other work-teams, as well as the follow-up, became the foremen's responsibility.

We interviewed 10 women operators who were working in cellular manufacturing, two foremen and one forewoman. The interviewees selected by the management had converted to Just-in-time and had received training. They voluntarily accepted to express their ideas on the change the company was undergoing and on the training they had received. Their age ranged from 30 to 56 years, the median age being 44, and their seniority, from 4 to 39 years. Nine of them had between 8 and 12 years of schooling, the others, between 4 and 7 years.

The interviews were done on site. Since the training was closely linked to the change introduced in the production itself, it was assumed that the reactions of the employees about their work could be relevant to the understanding of the training, and vice versa.

2. Training, its significance and its impact

The employees remembered their Just-in-time training as extremely stressful, the constraints being that they had to quickly react to the commands of the trainer, adjust to slightly different machines,

respect the pressure of the timing and move to the adjoining post, if help was needed to keep up the flow. However, they were on the whole quite positive about the introduction of Just-in-time methods. Most respondents did not have vivid memory of the other sessions on communication skills.

The technical aspect of Just-in-time training did not appear difficult for the employees who all had previous experience as operators. Even if some machines had been modified to adjust to the new layout and limit useless motions, someone with 21 years of experience and another one with 34 years of experience said that the machines were «not much different» (I 13); the youngest operator said this: «I had to learn, but it was not difficult because I knew how to sew; I had some school training in industrial sewing machines.» (I 8)

It was very demanding however to do a series of operations on three different machines within the time limit, and to pass on the work to the next operator: «It's difficult to keep the rythm, you have to work all the time, says one, you have to help the one who needs help; if a machine breaks, you move to the left or to the right». (I 7) Any technical problem on the line will create an accumulation of work and generate stress. In general, a willingness to adapt to new methods was demonstraded, and one worker went so far as to say: «I wish I had this training when I was twenty-five years old; it opens your mind; you discover new

things; for me, it's interesting». (I 2) It was evident for everybody that their competence was an asset. Keeping up with the pace of production and combining quality and timing was perceived as a challenge, although the employer's analysis was that the production was not so much more rapid as it was better organized. (I 20)

The employees focussed much more on the social skills required to work within a cell. They insisted on the importance of communication skills, on the spirit which makes a team productive and on solving the inevitable tensions. The training sessions had not been very long but with the vague memory of exercises related to understanding messages they could articulate their relevance. They were of the opinion that you should learn about communication before you learn to work on the production line, and that being able to talk to one another on the line was a condition for the success of the cell: «Communication is the most important part of it; if something goes wrong, we have to know where the problem is. If nobody says anything and you do not see the problem yourself, you can't get anywhere». (I 1) For some operators, it was extremely difficult to change behaviour, because they had been used to working alone and never had to interact much with other operators.

When the team works well together, there is shared responsibilities and motivation increases: «We can replace one

another, it's great!» (I 16); «I find it easier, there is no panic, you can get help». (I 12) When the team works well, it is self-regulated. However, susceptibilities cannot always be avoided in a group; personalities are different and interpretation can be distorted; an operator may not accept admonishments from another team member, may not understand the task as well as another, or may not have the same drive to keep up with the pace of the group. The foreman admits: «It's a group of employees, it cannot be wonderful all the time, there are all sorts of characters, you have to understand them, it takes years». (I 2)

When asked about the impact of the training, eleven out of thirteen interviewees mention the improvement in communication. Other subjective outcomes are the following, in order of importance: knowledge of self and of others(3), team spirit (2), tolerance(1), understanding of one's own work (1), greater competence(1) and greater personnal satisfaction (1). Only one objective outcome is mentioned, namely the specific rapport of Just-in time production with the client. The employees do not say much about the interest the company may have in the training process. One forewoman and one foreman are aware that the company needs autonomous and flexible operators and that, if there is better participation, the management and the production will improve (I 1,2); only one operator refers to the company's investment in training to the need to improve the productivity: «Maybe they needed change in production; maybe it's very important

because, before, say, you made one hundred pairs of pants, but now, you make two hundred, two hundred and fifty». (I 12) .

3. Discussion

At the time of the interviews, the company A was in the second phase of its training plan and the results appeared satisfactory for the employees as well as for the president. The strategic role of training is multi-faceted when we compare perspectives on Just-in-time or when we compare perceptions about industrial change and economic survival. That is what we want to discuss, assuming that in the planning of a major change in a company, the employees' experience is always critical.

Just-in-time is a mode of industrial organisation which aims at producing only what is needed and when it is needed. Concretely, it means that there is no accumulation of finished or intermediary products, that flexibility allows the filling of orders quickly to satisfy the client, that there is no waste of time, of work, of material or of motion on the production line, that the supplies are quality-controlled to avoid any delay, and that the workers are autonomous, flexible and able to understand the objectives of the company. It has been recognized that training the work-force is crucial for a company which wants to

convert to Just-in-time. The production line should also be rationalized.

Training must make the operators more polyvalent and flexible; according to Antier (1990), it must also include the control of the delays, develop communication skills and encourage everyone's commitment to the goals of the organization. Just-in-time is a set of techniques having to do with the reduction of production time and with the elimination of stocks. The ideal is that one could double the production within the same space, using an approach in which the production is self-controlled along the process and is customer-driven. Consequently, the introduction of Just-in-time requires some knowledge of theories and procedures related to problem-solving, total quality control, set-up time reduction, total productive maintenance or statistical process control.

However, Just-in-time also transforms the social dynamic on the production floor. Since the method requires constant monitoring at any point on the line, the employee shares the responsibility for the whole process; if any problem occurs, action must be taken, and «This requires a collaborative environment, where people focus on the problem and not on who to blame for it» (Charney, 1988, p. 15). The workers become the key factor of success, their competence is an asset in the process, but the synergy of the team is an added value. Consequently, the improvement of social and communication skills is necessary.

The president of company A had understood that a change in mentality was the corner stone of the increase in productivity. Expressing his view on the impact of training, he said that «Everybody understood that we had to help one another». (I 20) For the employees, the communication required by the new mode of organization was the greatest challenge. Once they got used to cellular manufacturing, the operators began to have confidence in their own competence and took the more technical improvements as a matter of course; only the foremen had some idea of organizational methods or production planning. In summary, learning Just-in-time was, indeed, learning to perform multiple tasks on the production line but it was even more importantly learning communication skills; the employees themselves perceived that they were the condition of greater efficiency.

In present economic conditions, it is impossible to dissociate industrial training from survival strategies, but the employees may not have a clear idea of what is at stake, unless information about the results in terms of productivity and success on the market is given. When Just-in-time methods were introduced in company A, it was because the president thought they were more productive. But they meant restructuring of the workplace and putting new demands on the work-force; because substantial savings and high quality increase competitiveness, manufacturing better quality equipment had to be done at a lower cost and in a shorter time.

The company had reassured the employees about their jobs and was really counting on their input, but with the production system changing and expectations increasing, the employees had to be mobilized again. The employees had to develop a new rapport with their job and with the company. For the employees, there is a double edge to the new industrial rationale. On the one hand they are asked to become polyvalent and flexible: their multiple tasks create a challenge and a new responsibility which are a source of personal satisfaction; the company may reward their efforts with a bonus system, as was the case with company A.

On the other hand, the polyvalence, which is valued for flexibility, may be perceived by the employees as undermining the value of their own competence; as one operator said: «You are diminished; at least, that's the way I see it, if you're not there, no one really cares; they just get someone else because everybody can do your job». (I 11) Or the employees might resent being used in the process: «The change certainly brings more profit, as long as they do not treat us like little robots» (I 12) These perceptions do not necessarily mean that the employees won't adjust to the transformation of the workplace; as one operator said: «Before, we liked working the way we did, we didn't know anything else. Today it's more modern, it's better». (I 15) But they show how precisely the modernization of the workplace cannot be done without reinforcing the commitment of the employees.

In view of this, training plays a specific role; it makes possible a cohesion between the needs of the organization and the imperatives of production. This was obvious in company A which had fewer than two hundred employees and where the foremen met with the president regularly. Training sessions were aimed at improving the performance and also at espousing a culture.

Consequently, if learning Just-in-time was learning to perform multiple tasks on the production line and learning communication skills, it was also learning to redefine one's rapport with one's own work, and with the company.

Note

1. The data comes from a research project on *Industrial mutations and training*, for which we acknowledge the financial support of the Canadian Social Science and Humanities Research Council.

For identification purpose, we kept the original numbers for the interviews: I 1: forewoman; I 2 and 3: foremen; I 7-16: operators; I 20: the vice-president of the company.

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